# CLAIMS

1. A vacuum tube having a reduced-pressure vessel containing at least a discharge gas sealed for electric discharge, said vacuum tube characterized in that the sum total of the number of organic gas molecules, the number of water molecules, and the number of oxygen molecules remaining inside said reduced-pressure vessel is smaller than the number of molecules of said discharge gas.

2. A vacuum tube according to claim 1, characterized in that a ratio of said number of molecules of said discharge gas to the sum total of said number of organic gas molecules and said number of water molecules is not smaller than ten times.

3. A vacuum tube having a reduced-pressure vessel containing at least a discharge gas sealed for electric discharge, said vacuum tube characterized in that the number of water molecules adsorbed on an inner wall of said reduced-pressure vessel is not greater than $1\times10^{-16}$ molecules/$cm^2$ .

4. A fluorescent tube using the vacuum tube according to any one of claims 1 to 3.

5. A cold cathode tube using the vacuum tube according to any one of claims 1 to 3.

6. A deuterium discharge tube using the vacuum tube according to any one of claims 1 to 3.

7. An electron beam tube using the vacuum tube according to any one of claims 1 to 3.

8. An X-ray generating tube using the vacuum tube according to any one of claims 1 to 3.

9. An ultraviolet generator using the vacuum tube according to any one of claims 1 to 3.

10. A static electricity neutralizer using the vacuum tube according to any one of claims 1 to 3.

11. A vacuum tube according to any one of claims 1 to 3, characterized in that a gas/gases selected from the group consisting of He, Ne, Ar, Kr, Xe, $H_2$, and $D_2$ is/are used alone or mixed together as said discharge gas.

12. A vacuum tube according to any one of claims 1 to 3, characterized in that said reduced-pressure vessel is made of silicon oxide as a main component.

13. A vacuum tube manufacturing apparatus comprising a reduced-pressure vessel connecting portion, a gas exhaust mechanism connected to said reduced-pressure vessel connecting portion, and a gas supply mechanism connected to said reduced-pressure vessel connecting portion, said vacuum tube manufacturing apparatus characterized in that an inert gas supply mechanism is disposed on a reduced-pressure vessel side of said gas exhaust mechanism.

14. A vacuum tube manufacturing apparatus according to claim 13, characterized in that said gas exhaust mechanism is an exhaust pump and an inert gas supply mechanism is disposed on an exhaust side of said exhaust pump.

15. A vacuum tube manufacturing apparatus according to claim 13, characterized in that said gas exhaust mechanism comprises a pressure-reducing exhaust mechanism and a filling exhaust mechanism.

16. A vacuum tube manufacturing apparatus according to claim 15, characterized by having a first gas flow control mechanism on a gas supply mechanism side of said reduced-pressure vessel connecting portion, wherein said filling exhaust mechanism comprises a second gas flow control mechanism.

17. A vacuum tube manufacturing apparatus according to claim 16, characterized in that said first gas flow control mechanism includes at least an orifice.

18. A vacuum tube manufacturing apparatus according to claim 16 or 17, characterized in that said second gas flow control mechanism includes at least an orifice.

19. A vacuum tube manufacturing apparatus according to any one of claims 13 to 18, characterized in that said gas supply mechanism has at least a pressure control mechanism adapted to control a pressure inside the reduced-pressure vessel.

20. A vacuum tube manufacturing apparatus according to any one of claims 13 to 19, characterized in that said gas supply mechanism has at least a flow rate control mechanism adapted to control a flow rate of a gas flowing in said reduced-pressure vessel connecting portion.

21. A vacuum tube manufacturing apparatus according to any one of claims 13 to 20, characterized by comprising a second reduced-pressure vessel connecting portion different from said reduced-pressure vessel connecting portion, an inert gas supply mechanism connected to said second reduced-pressure vessel connecting portion, and a back diffusion prevention mechanism connected to said second reduced-pressure vessel connecting portion.

22. A vacuum tube manufacturing apparatus according to any one of claims 13 to 21, characterized in that said back diffusion prevention mechanism is a pipe or an orifice.

23. A vacuum tube manufacturing apparatus according to claim 22, characterized in that a gas flow rate flowing in said pipe is a flow rate for suppressing invasion of moisture into said gas supply mechanism from said reduced-pressure vessel connecting portion.

24. A vacuum tube manufacturing apparatus according to claim 22 or 23, characterized in that the gas flow rate flowing in said pipe falls within the range of 1SCCM to 1000SCCM when the reduced-pressure vessel is not connected.

25. A vacuum tube manufacturing apparatus according to any one of claims 13 to 24, characterized in that a moisture concentration measured at the first reduced-pressure vessel connecting portion is 1ppm or less.

26. A vacuum tube manufacturing apparatus according to any one of claims 13 to 25, characterized in that a surface adapted to contact the gas contains a metal oxide having chromium oxide or aluminum oxide as a main component.

27. A fluorescent tube manufactured by using the vacuum tube manufacturing apparatus according to any one of claims 13 to 26.

28. A cold cathode tube manufactured by using the vacuum tube manufacturing apparatus according to any one of claims 13 to 26.

29. A deuterium discharge tube manufactured by using the vacuum tube manufacturing apparatus according to any one of claims 13 to 26.

30. An electron beam tube manufactured by using the vacuum tube manufacturing apparatus according to any one of claims 13 to 26.

31. An X-ray generating tube manufactured by using the vacuum tube manufacturing apparatus according to any one of claims 13 to 26.

32. An ultraviolet generator manufactured by using the vacuum tube manufacturing apparatus according to any one of claims 13 to 26.

33. A static electricity neutralizer manufactured by using the vacuum tube manufacturing apparatus according to any one of claims 13 to 26.

34. A vacuum tube manufacturing method comprising a step of attaching a reduced-pressure vessel to a vacuum tube manufacturing apparatus, a step of exhausting a gas in said reduced-pressure vessel, a step of filling at

least a discharge gas into said reduced-pressure vessel, and a step of separating said reduced-pressure vessel filled with the discharge gas from said vacuum tube manufacturing apparatus, said vacuum tube manufacturing method characterized in that a dry inert gas is caused to flow in a reduced-pressure vessel connecting portion of said vacuum tube manufacturing apparatus before said reduced-pressure vessel is attached thereto.

35. A vacuum tube manufacturing method comprising a step of attaching a reduced-pressure vessel to a vacuum tube manufacturing apparatus, a step of exhausting a gas in said reduced-pressure vessel, a step of filling at least a discharge gas into said reduced-pressure vessel, and a step of separating said reduced-pressure vessel filled with the discharge gas from said vacuum tube manufacturing apparatus, said vacuum tube manufacturing method characterized in that the step of exhausting the gas in said reduced-pressure vessel is specified by carrying out combination of filling and exhaust of a dry gas a plurality of times.

36. A vacuum tube manufacturing method according to claim 35, characterized in that the step of exhausting the gas in said reduced-pressure vessel is carried out by raising said reduced-pressure vessel to a temperature higher than a room temperature.